

## ABSTRACT OF THE DISCLOSURE

A method for the layer-by-layer assembly of a free standing thin film includes the steps of preparing a support with a suitable substrate; forming a thin film having a plurality of layers onto the substrate utilizing a layer-by-layer assembly process; removing the substrate and thin film from the support; and separating the substrate from the thin film. Various compounds improving the strength, flexibility, tension and other mechanical properties may be included in the assembly to improve the structural quality of the film. Similar effect may also be achieved by cross-linking the applied layers.

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